

OPERATION & MAINTENANCE MANUAL

DFI No. : D00279

**Facility Type: Water Quality Biofiltration
Swale**



AUGUST, 2011

1. Identification

Drainage Facility ID (DFI): **D00279**
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Number) 40V-065
Location: District: 2B
Highway No.: 081
Mile Post: 6.10; 6.14 (beg./end)]
Description: This facility is located in Milwaukie, Oregon alongside NB Hwy 081 (OR99E), across from the Kellogg Creek Wastewater Treatment Plant, and just prior to where Kellogg Lake empties into the Willamette River. Access is obtained from the right shoulder of the highway.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer – Region 1 Tech. Center, Bruce Council, P.E., (503) 731-8319

Facility construction: 2007
Contractor: Eagle-Elsner Construction Company

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

This facility is located in Milwaukie, Oregon alongside NB Hwy 081 (OR99E), across from the Kellogg Creek Wastewater Treatment Plant, and just prior to where Kellogg Lake empties into the Willamette River.

Stormwater flows are directed northward toward the water quality facility via an upstream drainage ditch. The flows enter the facility by overtopping a riprap flow spreader with plastic lumber weir board; see Points A and C of the Operational Plan, Appendix A. Water quality flows are treated as they slow down and spread out when passing overtop the grass-lined swale filled with "swale bottom media". In order to safeguard any possibility of erosion due to higher flow storm events, medium duty porous pavement sections (filled with aggregate base, are placed at either end of the swale to further protect the swale. Also, it should be noted that there are two 6-inch perforated drain pipes, wrapped in geotextile, located on either side of the swale to help infiltrate the stormwater while it passes through the facility. Both drain pipes drain to the outlet structure (Type M-E Inlet).

Upon leaving the facility, the treated stormwater passes through the swale's outlet structure (the Type M-E Inlet) and a 12-inch storm pipe before out falling to Kellogg Lake to the north; see Point B on the Plan.

A. Maintenance equipment access:

Access is obtained from the right shoulder of the highway when driving northbound.

B. Heavy equipment access into facility:

- Allowed (no limitations)
- Allowed (with limitations)
- Not allowed

C. Special Features:

- Amended Soils
- Porous Pavers; One section-length of porous pavers are located at the upstream and downstream ends of the swale.
- Liners; Drainage geotextile is wrapped around 6-inch drain pipes (both sides).
- Underdrains; 6-inch drain pipes wrapped in geotextile (both sides).



Photo 1: Look south at the WQ swale toward the inlet. Hwy 81 is located to the right.



Photo 2: Look north at the WQ swale toward the outlet. Hwy 81 is located to the left.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 12-inch diameter outlet pipe located at the M-E inlet/outlet structure of the water quality biofiltration swale. This pipe is noted as point B on the Operational Plan, Appendix A. The use of sandbags overtop the outlet structure may assist in this effort.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

Designed into facility

Other, as noted below

An auxiliary outlet bypass device is not provided for in this facility.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

<http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml>

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- Table 1 (general maintenance)
- Table 2 (stormwater ponds)
- Table 3 (water quality biofiltration swales)
- Table 4 (water quality filter strips)
- Table 5 (water quality bioslopes)
- Table 6 (detention tank)
- Table 7 (detention vault)
- Appendix C (proprietary structure)
- Special Maintenance requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: <http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml>

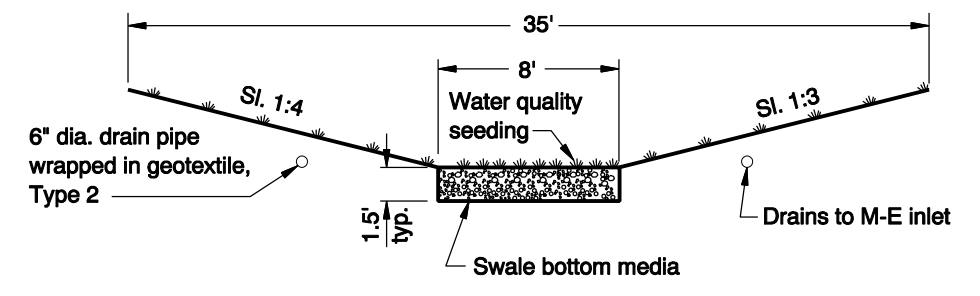
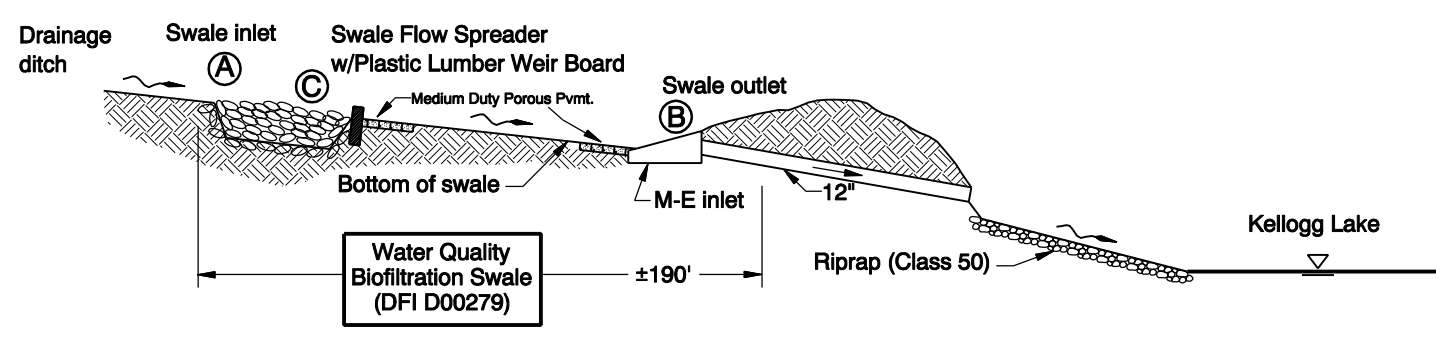
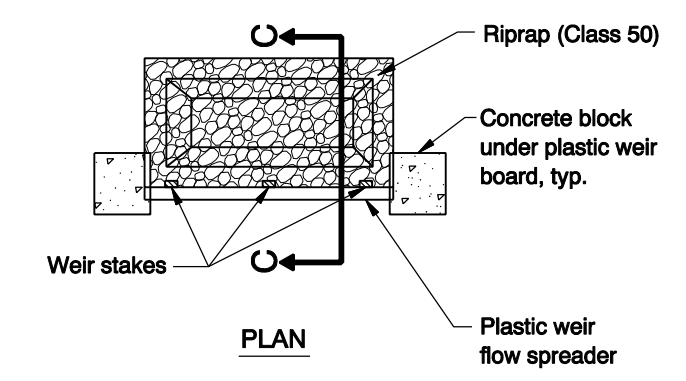
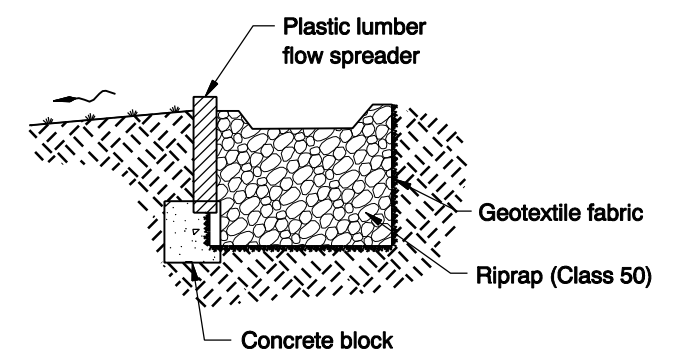
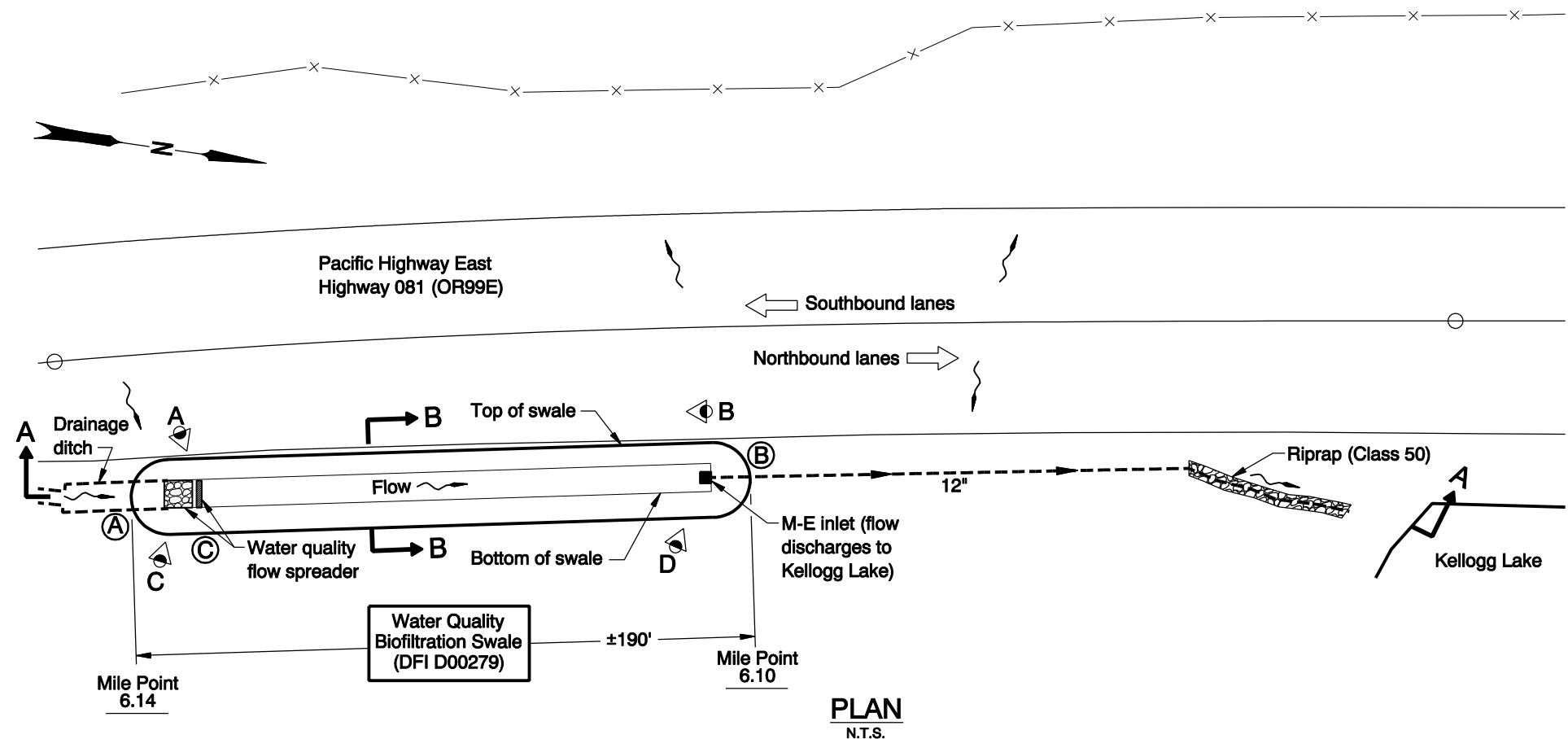
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8304
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

- **Operational Plan and Profile Drawing(s)**



- LEGEND:**
- Photo Location / Direction
 - Swale Inlet from Drainage Ditch
 - Swale Outlet (M-E Inlet)
 - Riprap and Plastic Flow Spreader
 - Manhole
 - Inlet
 - Storm Pipe (Facility)
 - Storm Pipe
 - Conveyance Direction
 - Pavement / Facility Flow Path

Sht. 1 of 1 OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J.D. Koziol

Drafted By: Heidi Skeen

DFI D00279
MAINTENANCE DISTRICT 2B HWY 81
WATER QUALITY BIOFILTRATION SWALE
 PACIFIC HIGHWAY EAST MP 6.10-6.14
 CLACKAMAS COUNTY

Appendix B

Content:

- **ODOT Project Plan Sheets**
 - *Cover/Title Sheet*
 - *Water Quality/Detention Plan Sheets*
 - *Other Details*

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1B	Std. Drg. Nos.

Revised Plan
Sheets Incorporated

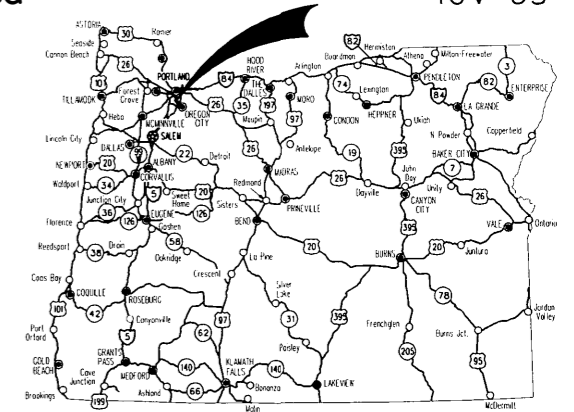
STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, PAVING, SIGNING, & SIGNALS

OR99E: KELLOGG CR. - M.P. 9.19 SEC.
PACIFIC HIGHWAY EAST

CLACKAMAS COUNTY
JUNE 2007



Overall Length Of Project - 3.22 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL
WORK TOGETHER
TO MAKE THIS
JOB SAFE

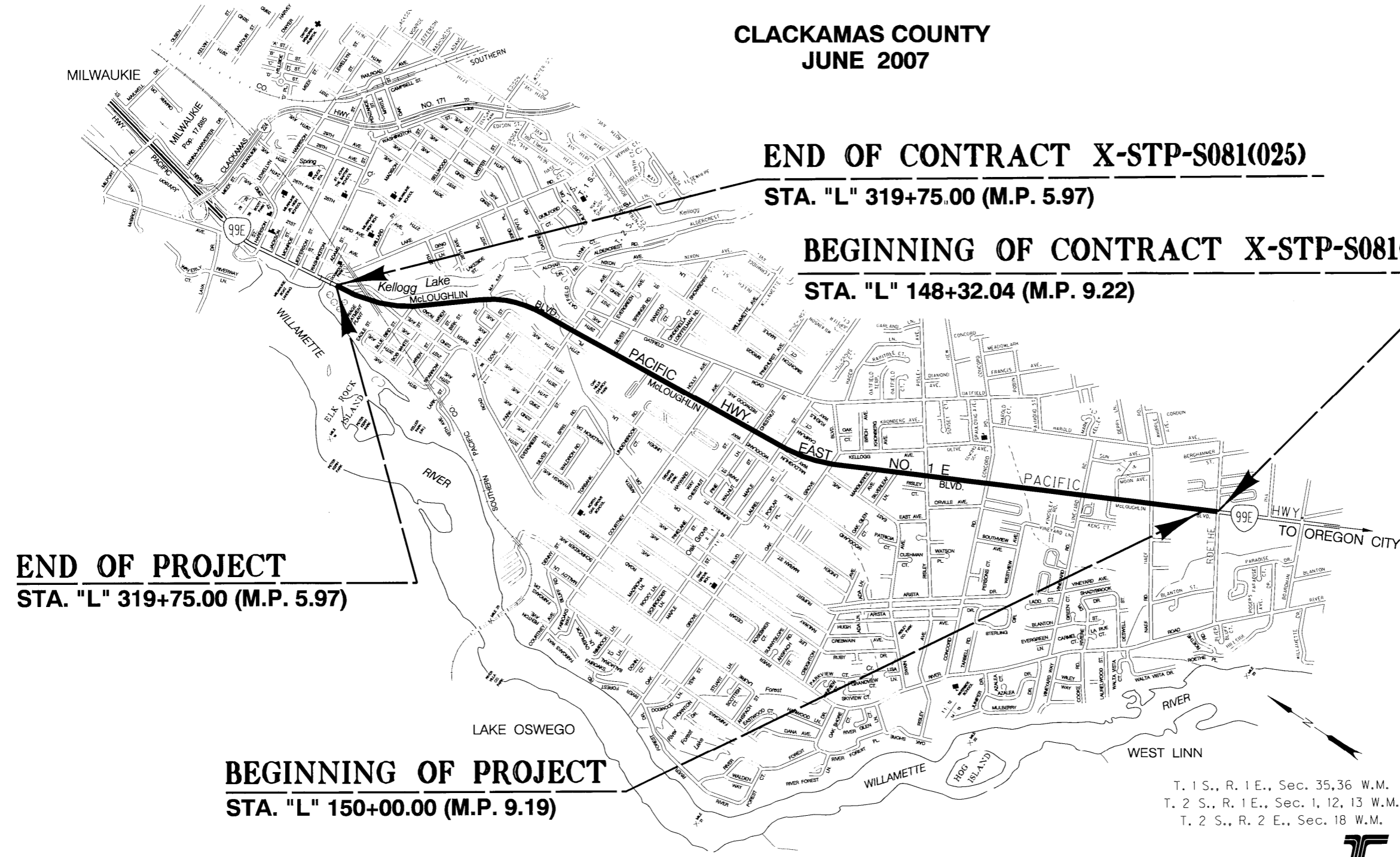
OREGON TRANSPORTATION COMMISSION
Stuart Foster CHAIRMAN
Gail L. Achterman COMMISSIONER
Mike Nelson COMMISSIONER
Randall Papé COMMISSIONER
Janice J. Wilson COMMISSIONER
Matthew L. Garrett DIRECTOR OF TRANSPORTATION



RENEWAL DATE: 12-31-2008
Catherine M. Nelson
CHIEF ENGINEER

OR99E: KELLOGG CREEK - M.P. 9.19 SEC.
PACIFIC HIGHWAY EAST
CLACKAMAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-STP-S081(025)	1



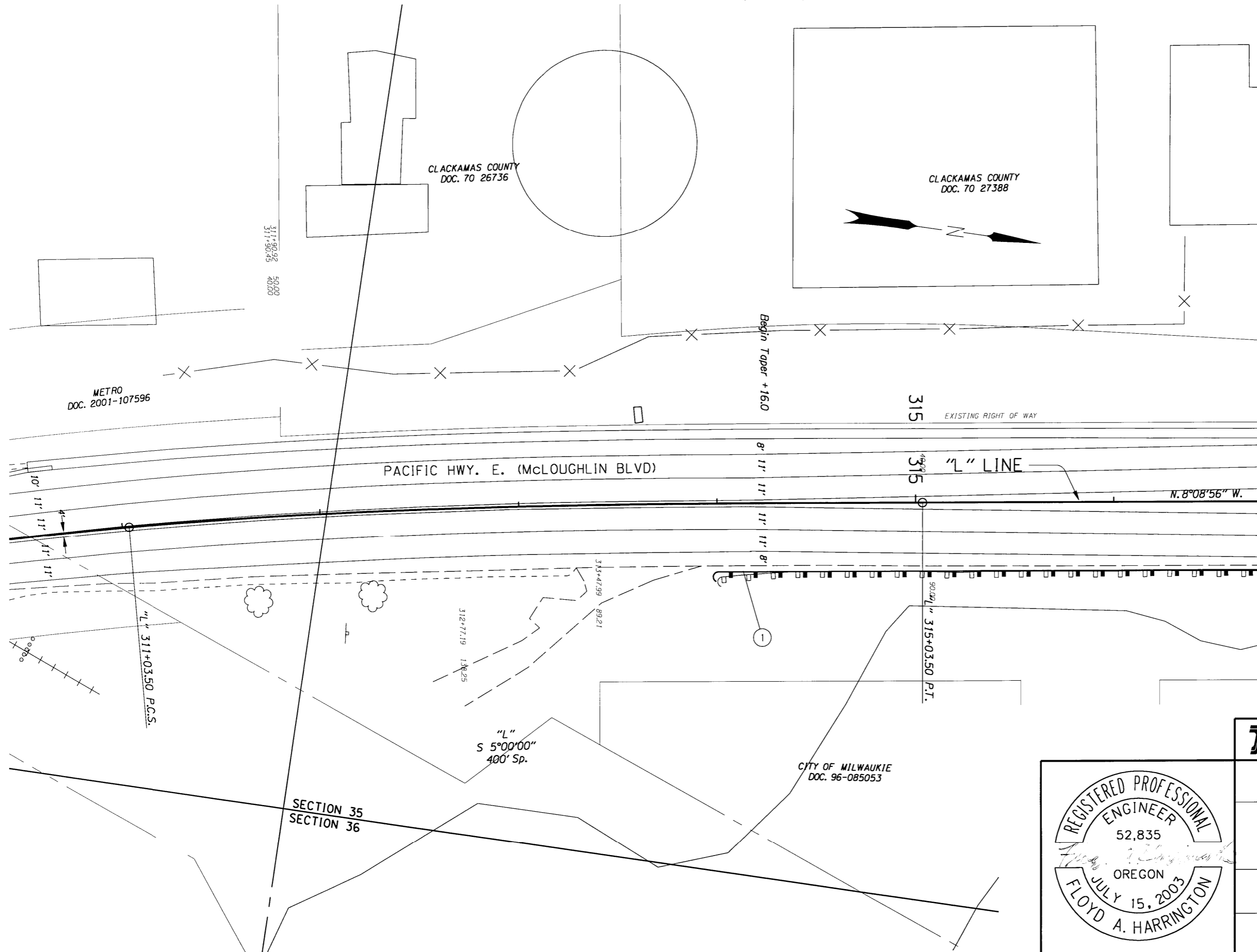
T. 1 S., R. 1 E., Sec. 35,36 W.M.
T. 2 S., R. 1 E., Sec. 1, 12, 13 W.M.
T. 2 S., R. 2 E., Sec. 18 W.M.




T. 2 S., R. 1 E., W.M.

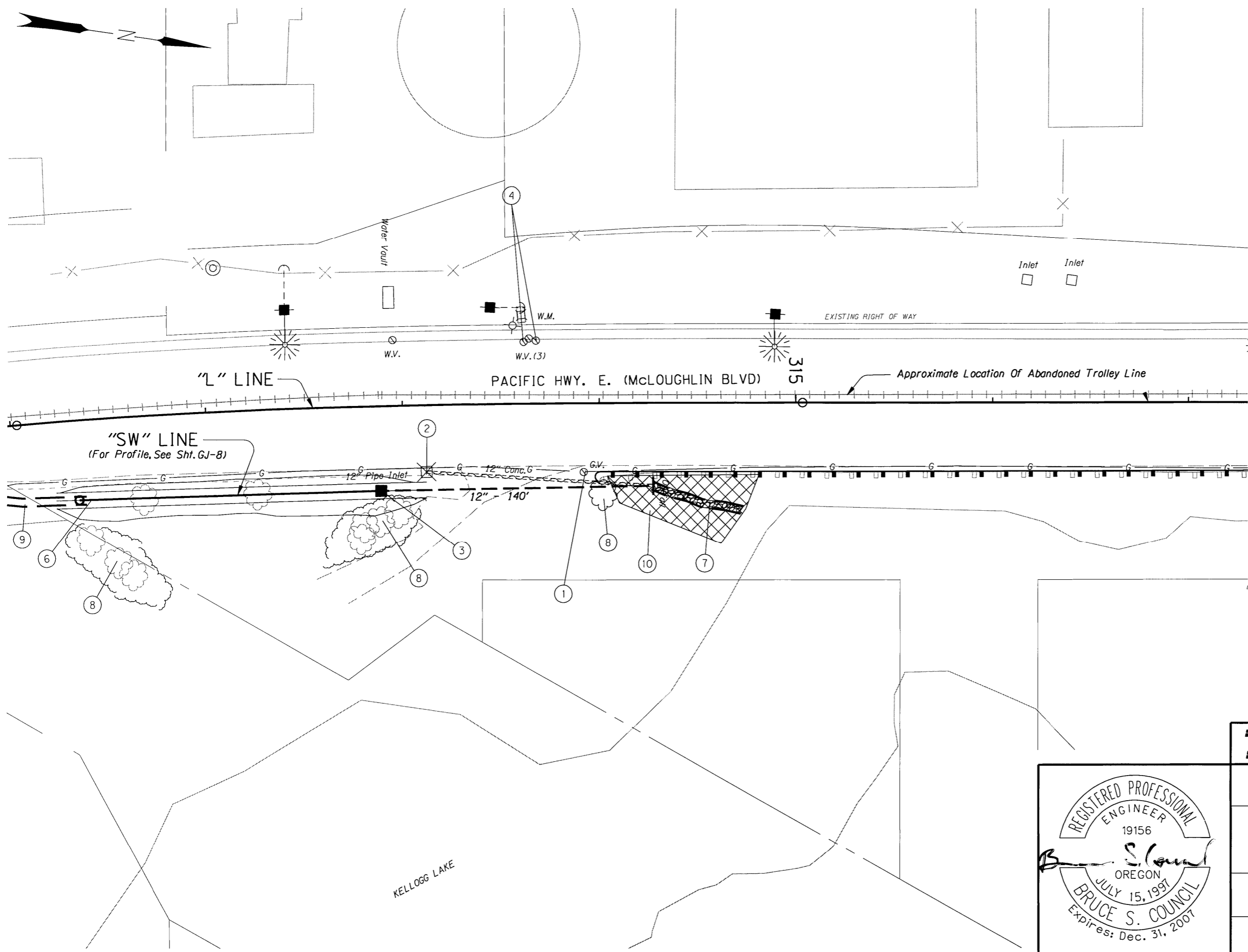
40V-65

① "L" 314+00.6 To "L" 313+37.3 Rt.
Remove Extg. Guardrail - 536'
Const. Type 2A Guardrail - 456.53'
Const. Non-Flared Terminal - 50'



RENEWAL DATE: 6-30-2007

 OREGON DEPARTMENT OF TRANSPORTATION	
REGION 1 - ROADWAY ENGINEERING SECTION	
OR99E: KELLOGG CREEK - M.P. 9.19 SEC. PACIFIC HIGHWAY EAST CLACKAMAS COUNTY	
Project Leader - Rick Keene Designed By - Scott Falmezger Drafted By - Scott Falmezger	
ALIGNMENT AND GENERAL CONSTRUCTION	SHEET NO. 30



- ① Adjust Gas Valve (By Others)
- ② Remove Inlet
- ③ Sta. "SW" 7+41.56
Const. Type "M-E" Inlet
Inst. 12" Sew. Pipe - 140'
5' Depth
(See Drg. No. RD368)
- ④ Adjust Water Valve - 2 (By Others)
- ⑤ Sta. "SW" 5+48.27 To Sta. "SW" 7+36.60
Const. Flat Bottom Swale - 163 CY
(For Details, See Shts. GJ-12 & GJ-13)
- ⑥ Sta. "SW" 5+35.00
Const. Water Quality Flow Spreader
(For Details, See Sht. GJ-12)
- ⑦ Const. Loose Rip Rap (Class 50) - 35 CY
Rip Rap Geotextile Type "2" - 100 Sq.Yd.
(For Details, See Sht. GJ-10)
- ⑧ Protect Tree Area
- ⑨ See Sht. 29A, Note 4
- ⑩ Clear & Grub Area Shown Thus:

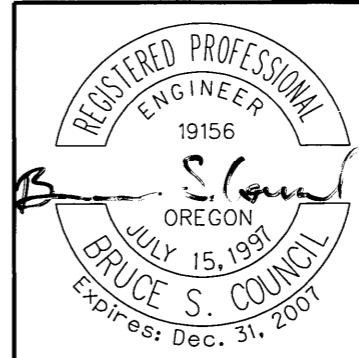
Plug & Abandon Pipe Shown Thus:

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 GEO/HYDRO UNIT

OR99E: KELLOGG CREEK - M.P. 9.19 SEC.
PACIFIC HIGHWAY EAST
CLACKAMAS COUNTY

Project Leader - Rick Keene
Designed By - Bruce Council
Drafted By - Charlotte Gerken

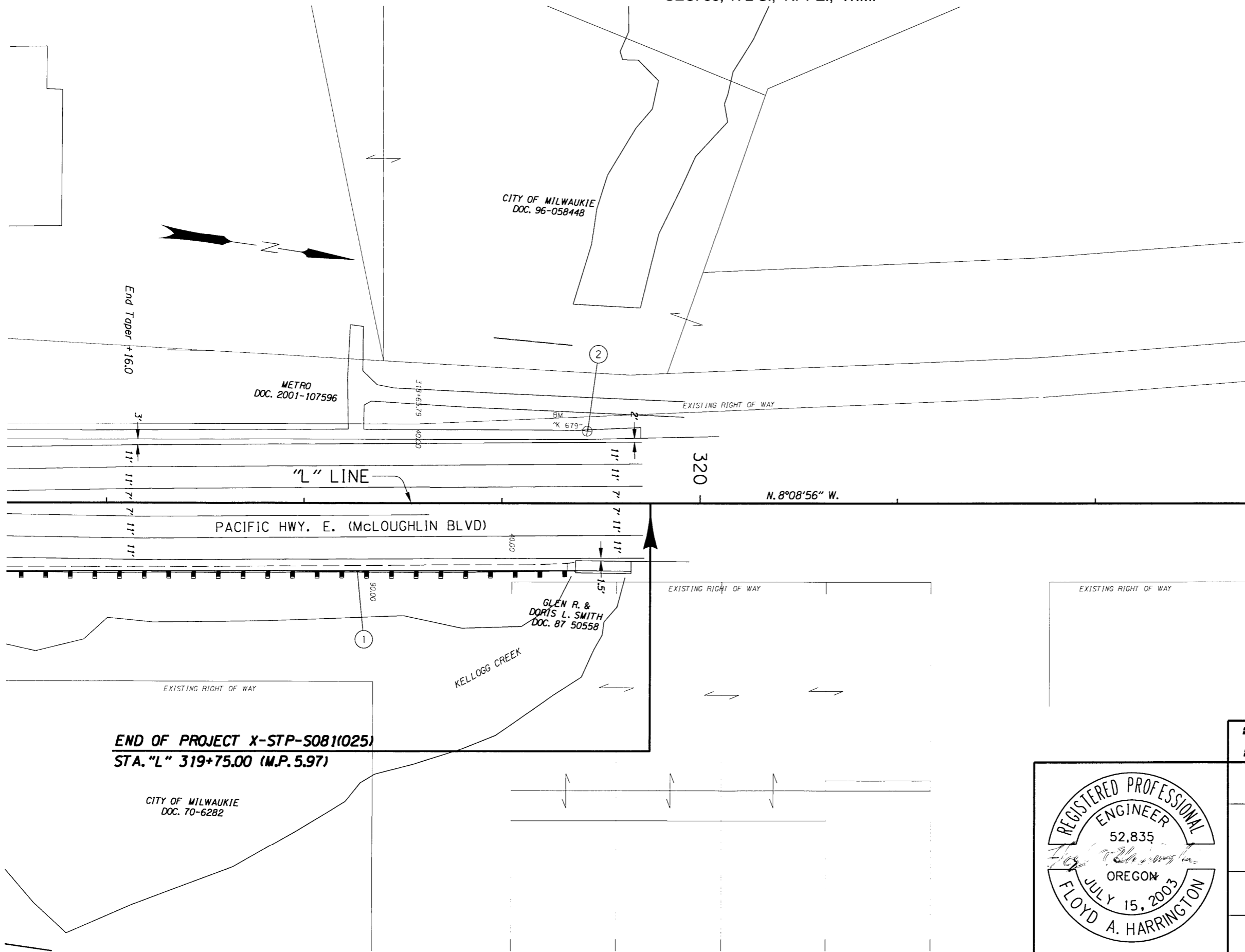


DRAINAGE & UTILITIES

SHEET NO.
30A

- ① See Sht. 30, Note 1
Remove Extg. Guardrail
Const. Type 2A Guardrail
Const. Type 3 Guardrail - 12.5'
Const. Guardrail To Bridge Rail Transition
(See Drg. No. BR203)

- ② Protect And Preserve Extg. Bench Mark



END OF PROJECT X-STP-S0811025
STA. "L" 319+75.00 (M.P. 5.97)

CITY OF MILWAUKIE
 DOC. 70-6282



RENEWAL DATE: 6-30-2007

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - ROADWAY ENGINEERING SECTION

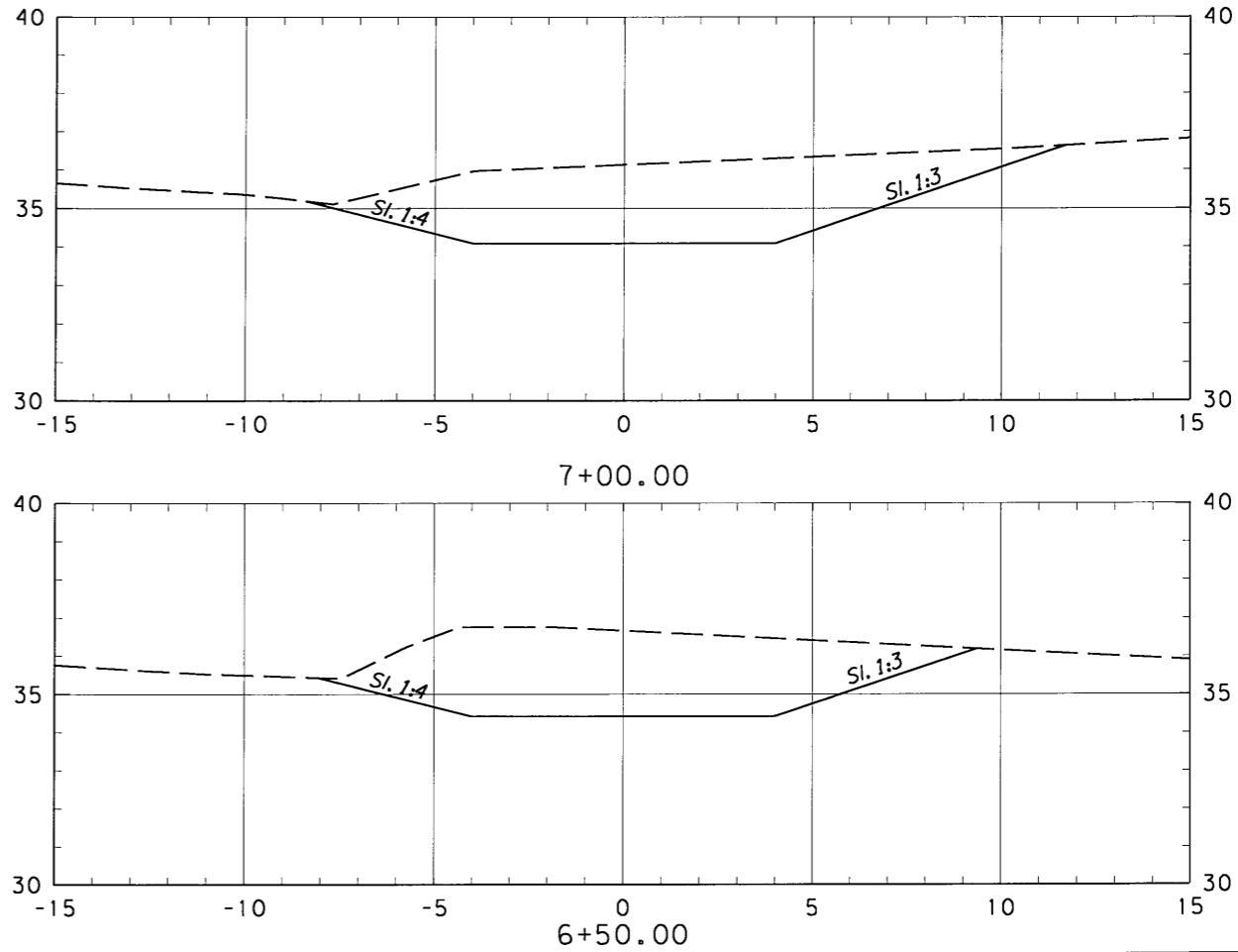
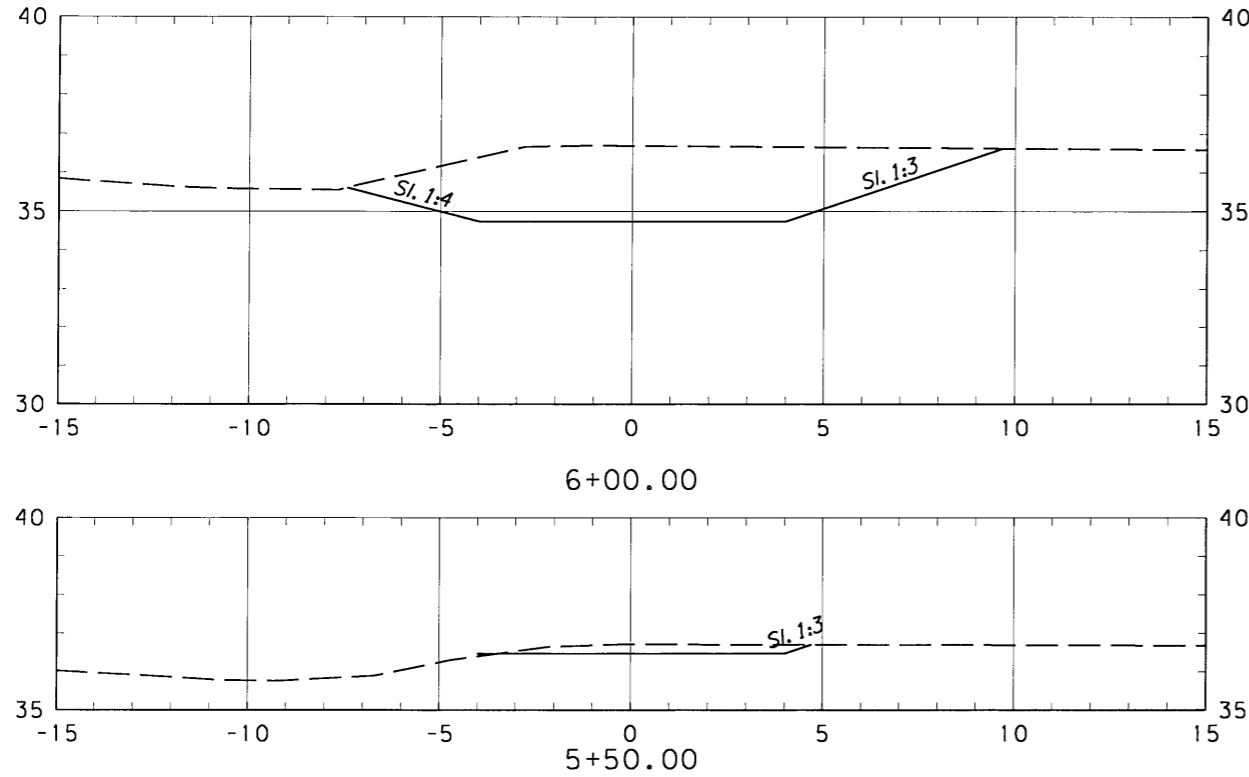
OR99E: KELLOGG CREEK - M.P. 9.19 SEC.
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 CLACKAMAS COUNTY

Project Leader - Rick Keene
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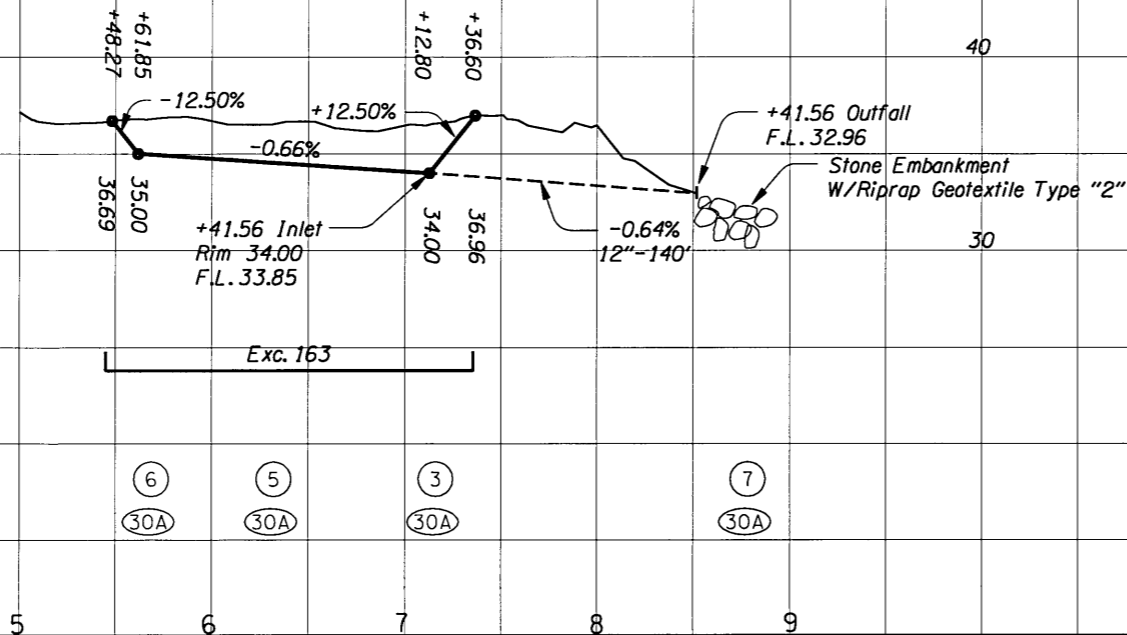
**ALIGNMENT AND
 GENERAL CONSTRUCTION**

SHEET
 NO.
31

"SW" SECTIONS



"SW" PROFILE



(X) - Note Number
 (XXX) - Sheet Number

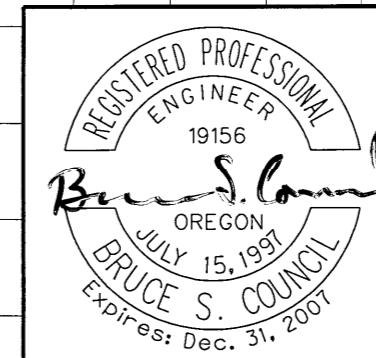
- NOTE:
- Rim Elevations Are Estimated Finish Grade Pavement Elevations And Should Be Checked With The Construction Office Prior To Ordering Structures.
 - If A Single FL Is Given For A Structure, It Represents A Point At The Center Of The Structure From Which Entering And Exiting Pipe Invert Elevations At Structure Walls And Sump Invert Elevations (12" Below Given Point) Shall Be Calculated.

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 GEO/HYDRO UNIT

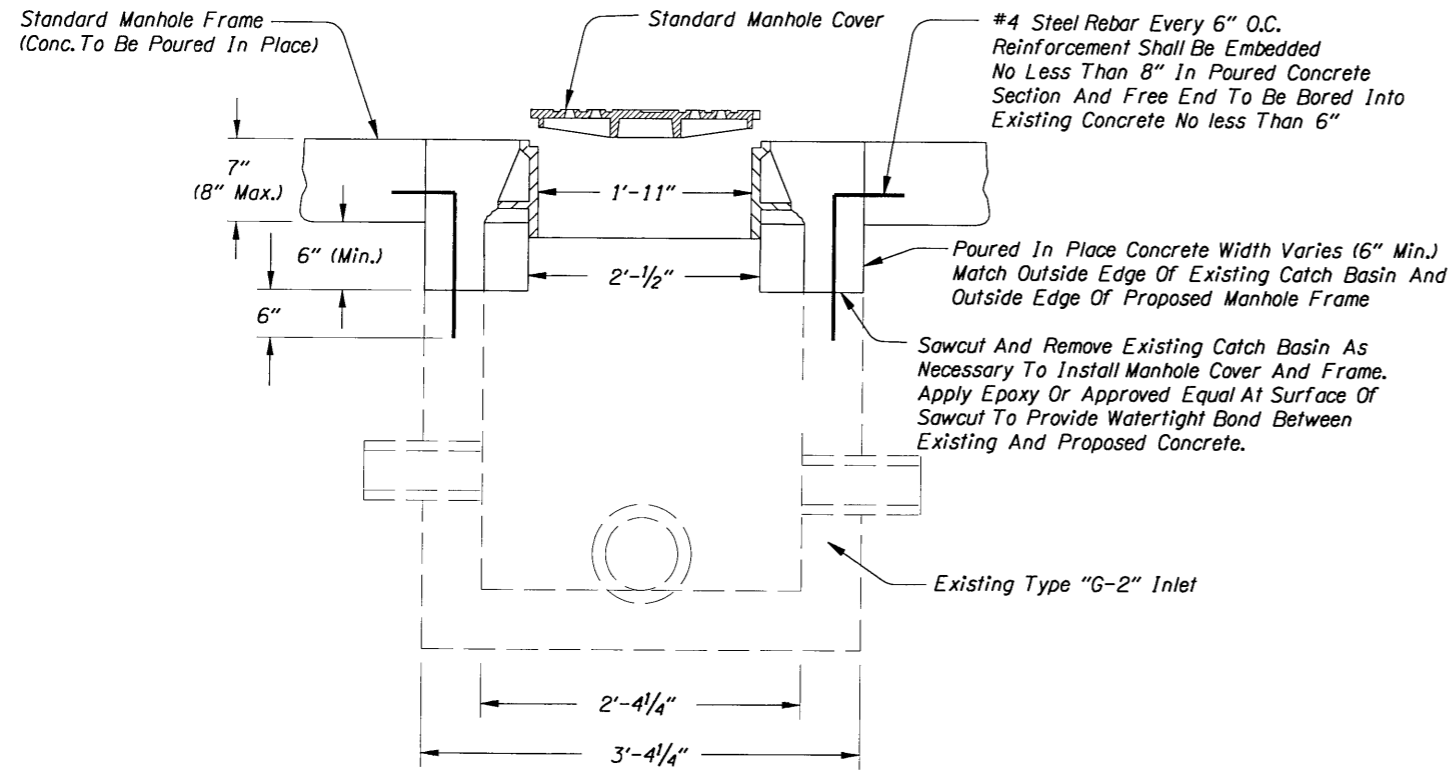
OR99E: KELLOGG CREEK - M.P. 9.19 SEC.
 PACIFIC HIGHWAY EAST
 CLACKAMAS COUNTY

Project Leader - Rick Keene
 Designed By - Bruce Council
 Drafted By - Charlotte Gerken



DRAINAGE DETAILS

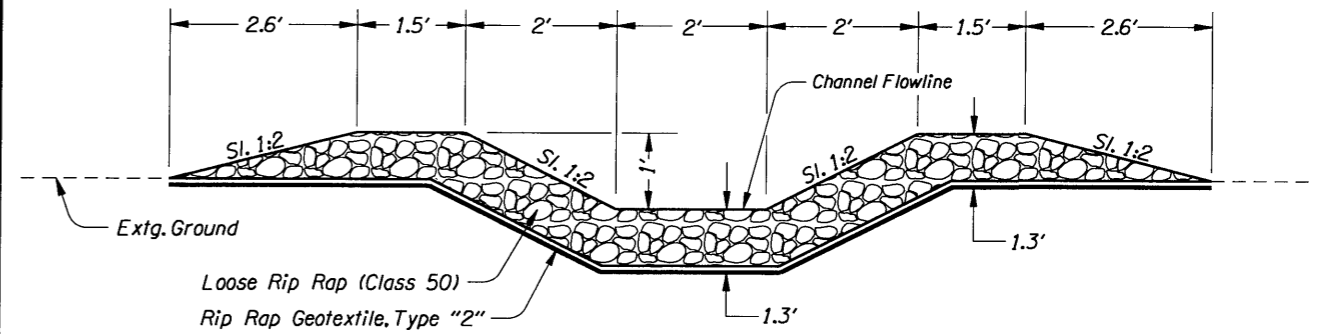
SHEET NO.
GJ-8



MANHOLE RIM ADDITION TO EXISTING CATCH BASIN
(For Details Not Shown, See Drg.No.RD356)

NOTE:

1. All Material And Workmanship Shall Be In Accordance With The State Of Oregon Standard Specifications For Highway Construction.
2. Existing Inlet Assumed To Be Standard ODOT Type "G-2", Contractor To Field Verify Dimensions And Notify Engineer Immediately In the Event Of Any Discrepancies.



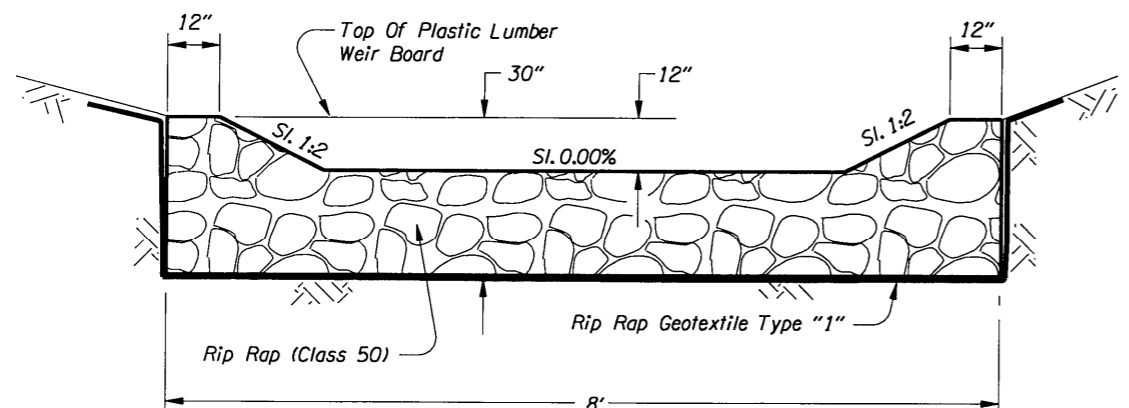
**LOOKING DOWNSTREAM
RIP RAP CHANNEL**



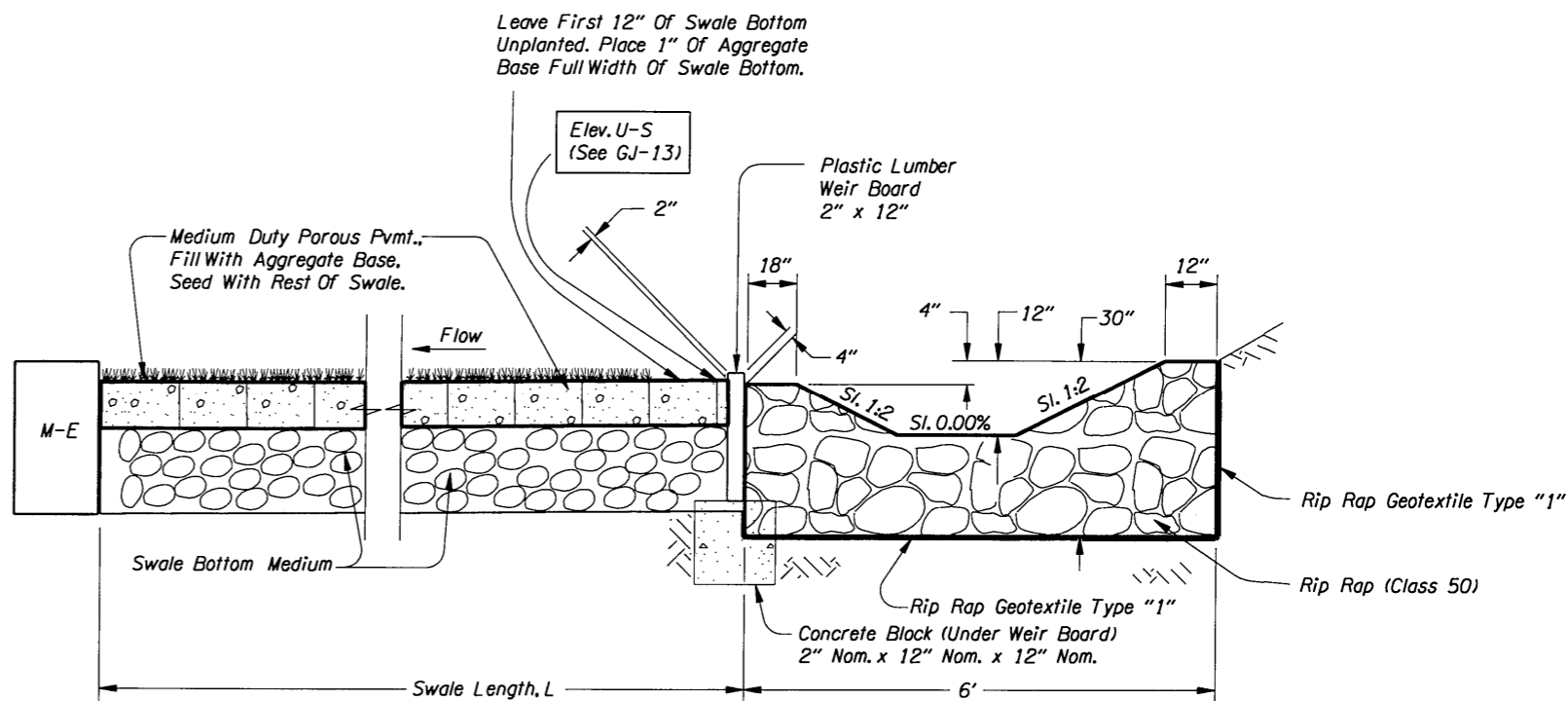
OREGON DEPARTMENT OF TRANSPORTATION	
REGION 1 GEO/HYDRO UNIT	
OR99E: KELLOGG CREEK - M.P. 9.19 SEC. PACIFIC HIGHWAY EAST CLACKAMAS COUNTY	
Project Leader - Rick Keene Designed By - Bruce Council Drafted By - Charlotte Gerken	
DRAINAGE DETAILS	SHEET NO. GJ-10

WATER QUALITY SWALE FLOW SPREADER

40V-65

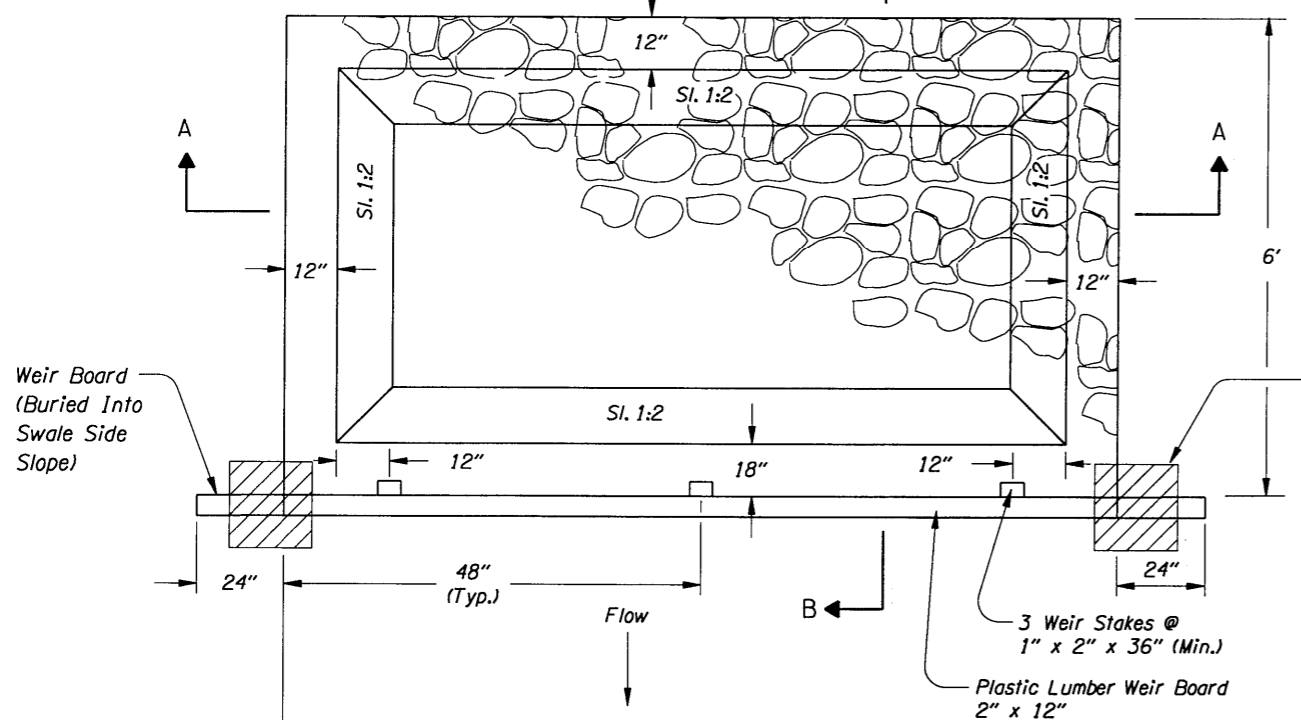


SECTION A-A



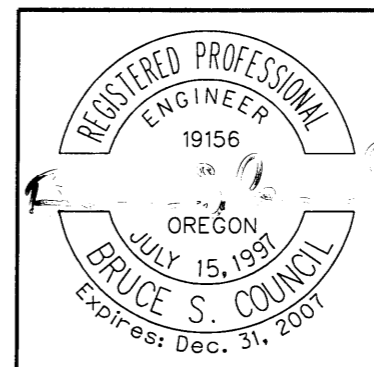
SECTION B-B

Note:
Place A Section Of Medium Duty Porous Pavement, Full Width Of Swale Bottom
At The Upstream And Downstream Ends Of Each Swale Or Swale Segment.



PLAN

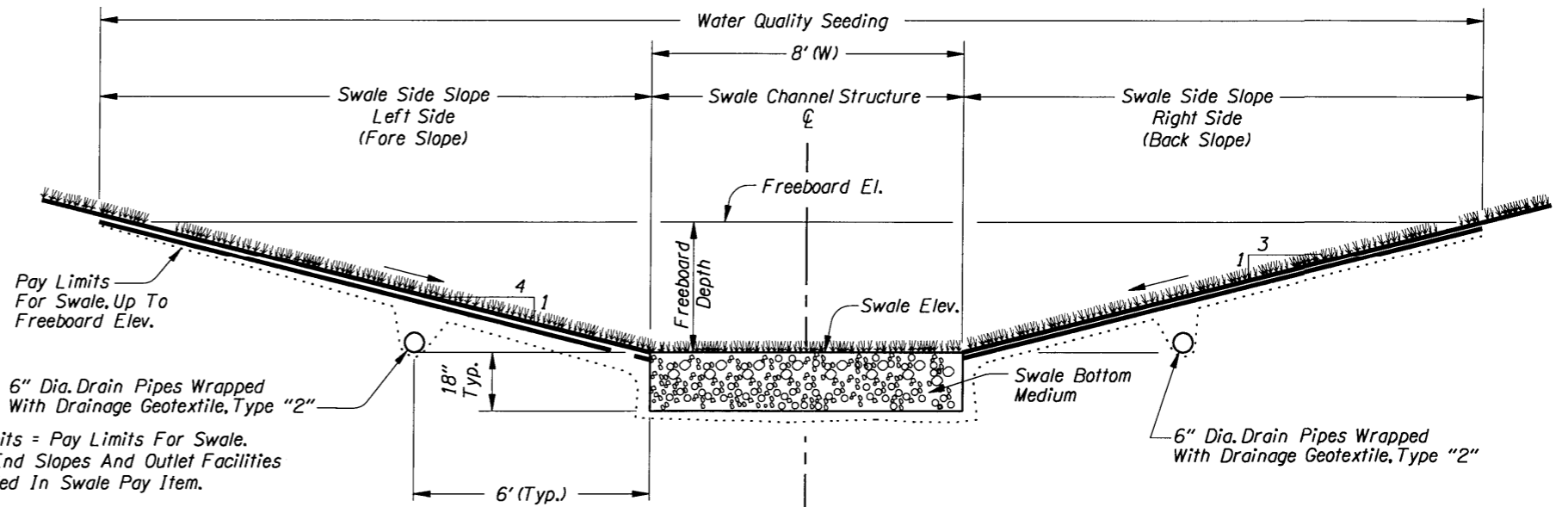
SWALE FLOW SPREADER



OREGON DEPARTMENT OF TRANSPORTATION	
REGION 1 GEO/HYDRO UNIT	
OR99E: KELLOGG CREEK - M.P. 9.19 SEC. PACIFIC HIGHWAY EAST CLACKAMAS COUNTY	
Project Leader - Rick Keene Designed By - Bruce Council Drafted By - Charlotte Gerken	
DRAINAGE DETAILS	SHEET NO. GJ-12

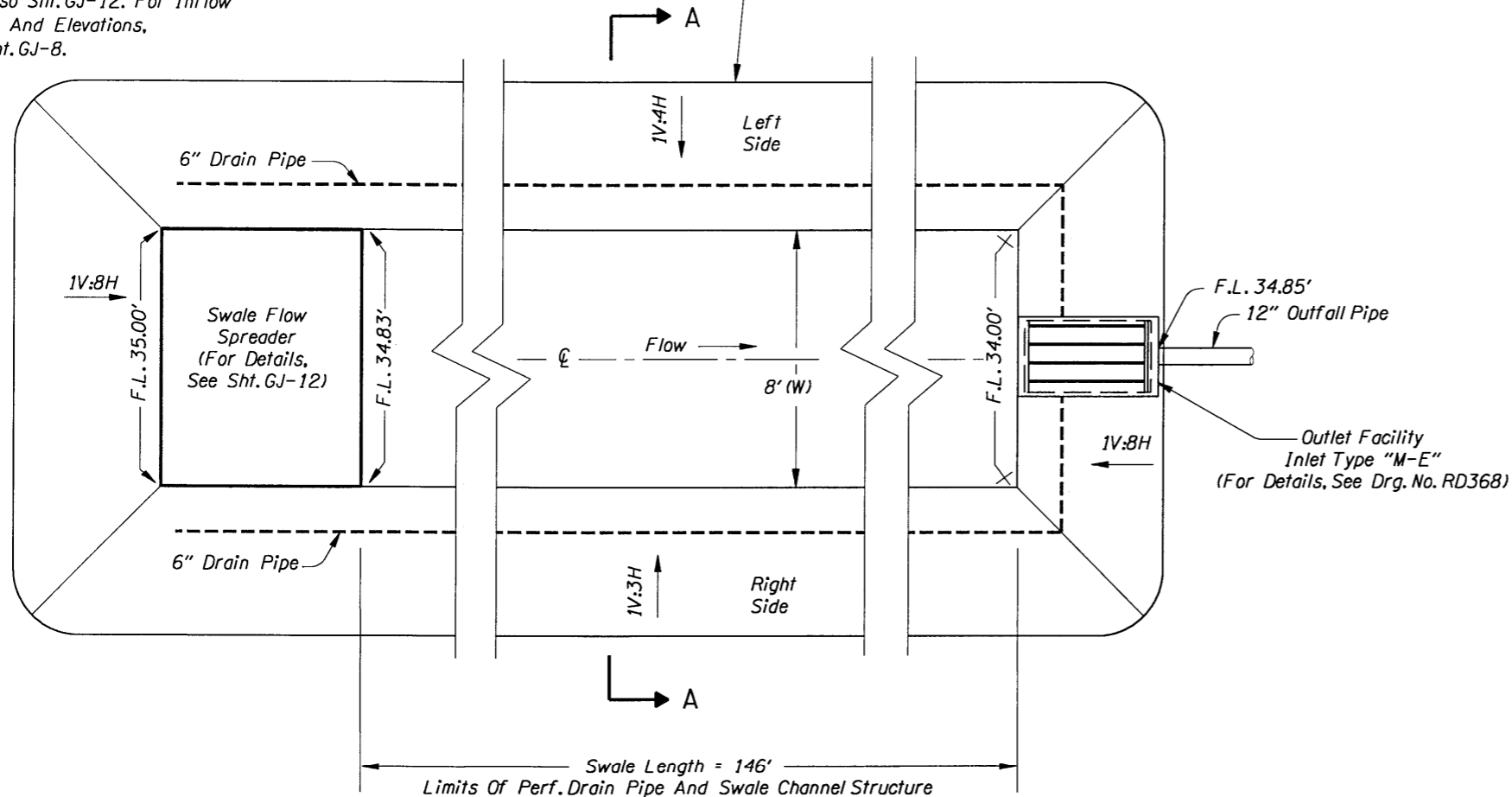
WATER QUALITY SWALE GENERAL DETAILS
PLAN AND TYPICAL CROSS-SECTION

40V-65



SECTION A-A AND UNDER DRAIN

For Additional Section A-A Details,
See Also Sht. GJ-12. For Inflow
Details And Elevations,
See Sht. GJ-8.



PLAN



OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 GEO/HYDRO UNIT

OR99E: KELLOGG CREEK - M.P. 9.19 SEC.
PACIFIC HIGHWAY EAST
CLACKAMAS COUNTY

Project Leader - Rick Keene
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DRAINAGE DETAILS

SHEET NO.

GJ-13